JPRS 77398

17 February 1981

# Japan Report

## No. 118

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ECONOMIC

## HIGHLIGHTS IN ENERGY POLICY FOR 1981

Tokyo TSUSAN JANARU in Japanese Vol 13, No 8, Nov 80 pp 90-103

[Article by Agency of Natural Resources and Energy]

[Text] Promotion of Policies for Maintaining a Stable Petroleum Supply--
Petroleum Department, Planning Section

The mid- and long-range supply and demand situation for petroleum is becoming tighter worldwide. It has become imperative, in terms of energy security, for Japan to reduce its dependence on oil by cutting back on oil consumption and actively promoting the development of substitutes for oil. However, considering that a great deal of time will be required to substitute alternative sources of energy for oil, it is expected that it will be necessary for the Japanese economy to continue depending on oil for most of its energy needs for some time to come.

Thus the maintenance of a stable supply of petroleum energy, which is the basis for Japanese economic development, is an extremely important issue in energy policy.

With this viewpoint, MITI plans to actively promote various measures required to maintain a stable oil supply as its new policy for 1981. The important measures are explained below.

### Diversified Maintenance of Oil Supply

Since the 1978 change of government in Iran, the supply of oil to Japan from the majors, which constituted about 70 percent of our oil imports, has dropped sharply, to about 50 percent at present. Under these circumstances, it is indispensable to further increase the amount of crude purchased through direct dealings and government-to-government dealings in order to maintain a stable oil supply. For that purpose, it is extremely important to work for closer relations with the oil producing countries by promoting improvement of the technical and human capabilities of the oil producing countries. In recent years especially, the oil producing countries have been actively moving into major industrialization in such areas as oil refining. But they are lacking in technical and human resources and are making urgent requests to the advanced countries for cooperation in these areas. Therefore, as an undertaking for Japan in 1981, research personnel from oil producing countries will be trained in oil technology and petroleum market information in order to upgrade their ability. In order to do this, the Oilman Center Foundation (tentative name) will be established as a central organ for strengthening relations with the oil producing countries.

The foreign exchange risk is also a great obstacle to financing the oil purchases, exploration, and development projects that are tied to stable crude oil supplies. Therefore, a fund is being established by the Japan Petroleum Development Corporation for adjustment of foreign exchange profit and loss. Based on this fund, the Japan Petroleum Development Corporation will conclude a foreign exchange profit and loss adjustment agreement with project participants in order to create a system to compensate for foreign exchange risk.

Promotion of Petroleum Development

In order to maintain a stable oil supply for Japan, it is important to secure independent supply sources. To do so, it is necessary to promote foreign and domestic petroleum development by Japanese petroleum development companies and actively secure the independent development of crude oil.

In 1981, investment and loans for exploration projects by the Japan Petroleum Development Corporation will be expanded. It will provide financing for 80 percent of the costs of projects on the continental shelf off Japan and 70 percent of overseas projects. Also, arrangements will be made to allow the Japan Petroleum Development Corporation to provide financing for the following types of projects that are in the development stage: (1) when it is necessary for the Japan Petroleum Development Corporation to provide funding because of the relationship with the government of the country involved, (2) when the lead time of the development stage is long and it is necessary to lighten the interest burden associated with developmental funding, and (3) when there is a great risk in the development stage. Also, when a petroleum development company receives a loan from the Japan Export Import Bank or a commercial bank in the development stage, the Japan Petroleum Development Corporation will guarantee 60 percent of the debt. Financed oil purchase projects will be added to the projects subject to the loan guarantee, and in addition, the percentage of the debt guaranteed will be raised under certain conditions such as high risk.

In addition to these financing and loan guarantee undertakings, there will be a tremendous expansion in the number of overseas geological surveys conducted by the Japan Petroleum Development Corporation. In short, the Japan Petroleum Development Corporation will actively conduct geological surveys prior to development in order to promote the development of unexplored regions scattered around the world. In recent years, these surveys have become the most effective means to acquire concessions.

Domestic oil and natural gas resources are the most stable of supply sources and active exploration and development of these resources is extremely important in terms of stability of petroleum supplies. Therefore, on the basis of the Petroleum Council's "Report Concerning Domestic Petroleum and Natural Gas

Resource Development" which was published in July 1979, it is necessary for the Japanese government itself to carry out a basic survey and ascertain the possibility of deposits of petroleum and natural gas resources in the country or adjacent ocean areas in order to encourage exploration and development activities by private enterprise.

For this purpose, a basic survey will be conducted in 1981 continuing from the previous year, based on the fifth 5-year plan for domestic petroleum and natural gas development. In addition, in 1982, a preparatory survey of sea floor geology and ocean currents will be made in the proposed ocean area for basic trial drilling and the basic trial drilling of the land areas will be performed for smooth implementation of the plan and acceleration of development.

In the past, assistance has been given for domestic natural gas exploration by private industry through the natural gas exploration assistance program. However, since the actual rate of assistance has been rather low--about 30 percent--the motivation for exploration has been decreasing significantly year by year. Therefore, the assistance rate will be raised to 50 percent in 1982 to increase the motivation of private industry for exploration, thus this encouragement will be provided for active exploration and development.

In order to accelerate our country's petroleum exploration and development, radical improvement in our petroleum development technology is essential. Some important measures based on this view are as follows:

(1) Construction of a New Petroleum Collection and Survey Ship

It is necessary to actively move into unexplored regions where oil may be present such as the polar or deep sea regions in order to promote independent overseas petroleum development as an effective means to establish an autonomous oil supply. For this purpose, construction of the newest type of oil probe vessel will be started in 1981 to make it possible to explore for oil under the most severe conditions. It will be used for the Japan Petroleum Development Corporation's geological surveys and and Antarctic region petroleum resource surveys.

(2) Establishment of a Petroleum Development College

The number of petroleum development experts in our country is no greater than that of a single independent oil company in the United States. In terms of quality, they are far behind those in the major companies of the United States and Europe because of a lack of on-site experience and linguistic shortcomings. This technical problem is a great obstacle in acquiring and carrying out projects. A rapid solution to this problem is an urgent policy issue.

Therefore, the Petroleum Development College (tentative name) will be established within the Japan Petroleum Development Corporation in order to systematically train petroleum development experts which our country needs and to promote the independent development of petroleum and natural gas. It will provide practical training, mainly on-the-job training, in domestic petroleum and natural gas exploration and development and in the production fields.

### (3) Research in Development Technology for Unused Hydrocarbon Resources

With the recent jump in petroleum prices, it is becoming commercially feasible to develop oil shale and oil sand, increase production of petroleum resources by double or triple recycling, and pursue development in regions such as the polar or deep sea regions under severe natural conditions. It is expected that these will be important energy resources of the future. It is urgent for Japan to establish and independently develop technology for these unused hydrocarbon resources. Therefore, starting in 1981, a national project will be undertaken to advance development of research for unused hydrocarbon resource technology.

### Promotion of Petroleum Stockpiling

In terms of maintaining a stable oil supply, it is an important and urgent matter for Japan to further increase its storage of oil in order to cope with emergencies, such as a cutoff of the oil supply due to problems in the oil producing countries. Various measures will be vigorously promoted for this purpose in 1981, including promotion of private stockpiling, construction of national petroleum stockpiling bases, and promotion of LPG stockpiling.

In 1980, a plan for 90-day stockpile for private industry was established. The 90-day stockpile will be achieved in 1981 and will be maintained thereafter. In order to effectively carry out this achievement and to maintain the stockpiles, loans will be made, as last year, from the Japan Petroleum Development Corporation for oil purchase funds necessary for oil storage by oil refiners. In addition, for the loans coming to maturity in 1981, the price will be reevaluated at the current CIF price and refinancing will be provided. Also, the Japan Petroleum Development Corporation is providing interest grants to lighten the interest burden to oil refiners. For new loans made in 1981, grants-in-aid will be provided for total interest and the extent of grants for interest on previous loans will be raised 2 percent across the board.

Furthermore, continuing from last year, the Japan Development Bank will provide funds for construction of storage facilities by oil refining companies and the Japan Petroleum Development Corporation will provide construction loans for storage facilities built by cooperative storage companies.

The immediate goal for national stockpiling is 30 million kiloliters to be stored quickly by the Japan Petroleum Development Corporation. The corporation will proceed energetically to acquire the necessary land for construction of permanent tanks and provide funding and loans to a national oil storage company.

To provide continuity until a storage system with permanent tanks is ready, the following measures will be undertaken to continue stockpiling in tankers which has been carried out since 1978.

1. A short-term government guarantee will be given for purchase funds for crude oil to be stockpiled in tankers which are borrowed by the Japan Petroleum Development Corporation from commercial banks and the total interest on such borrowings will be subsidized.

2. The necessary funds for continuing tanker stockpiling, including those for charter fees and fuel costs, will be granted to the Japan Petroleum Development Corporation. The corporation will pay the necessary operating costs for these undertakings.

Also, to expedite the establishment of oil storage facilities, a grant will be made to regional public utilities to subsidize costs incurred in maintaining public utility facilities.

LPG is used in more than 18 million households (about 60 percent of households consisting of more than 2 persons). It is also used by taxis and industry (a demand of 14 million tons in 1979). It is an important and indispensable energy source in the life of the nation. Looking at the supply structure for LPG, we see that the import volume and the import rate is growing year by year. In 1980, the import volume is expected to reach 10.4 million tons and the import rate is expected to reach 70 percent of total consumption. In order to cope with this supply situation and achieve a stable supply, it is essential to increase the stockpiling of LPG. Therefore a revision of the Petroleum Storage Law is under study by which stockpiling would be made obligatory for LPG importers. This is planned to go into effect in 1981.

In 1980, in order to achieve LPG stockpiling more efficiently, the Japan Petroleum Development Corporation will borrow funds from commercial financial institutions under a short-term government guarantee. It will use these funds to purchase the necessary LPG for the expanded stockpile that will be built up by LPG importers. The corporation will loan to the LPG importers up to 90 percent of the necessary funds without interest. A grant for the total interest on these funds (9.5 percent) will be paid to the Japan Petroleum Development Corporation. Also, in order to speed up construction of LPG storage tanks, the Japan Development Bank will loan 70 percent of the funds necessary for storage tank construction to importers at special interest rates.

In addition, a cooperative LPG company system will be set up. Assistance will be provided and location compensation grants will be made for LPG tank construction just as in the past.

Promotion of Petroleum-Related Technological Development

The crude oil imported by Japan is tending to become heavier every year. On the other hand, the demand for petroleum products is moving to lighter oil because of expanded demand for products of intermediate cracking such as kerosene and gasoline. If this situation is left unchecked, sooner or later a gap will occur between supply and demand: an excess of heavy oil and a shortage of intermediates. As a strong measure to cope with this situation, a cooperative association was set up in June 1979 to study ways of dealing with heavy oil. It is composed of 26 individuals from 25 companies and one research laboratory who are in related industrial fields such as oil refining, steel, electrical power and engineering. The association has the aim of quickly obtaining the technology to use heavy oil effectively. Under a 4-year plan beginning in 1979, research and development of technology to deal with heavy oil, centering around cracking technology, is being carried forward as a national project by this association. This research and development will continue vigorously in 1981.

Also, as imported crude oil tends to become heavier and the demand for lighter products grows, the problem of disposing of residue from heavy oil, such as pitch and petroleum coke, will become very apparent. For this reason, it is considered necessary to promote development of technology for effective use of heavy oil residue, and to promote comprehensive studies of this technology by exploring new fields of study and through development of this technology both at home and abroad. In 1981, on the basis of this view, there will be 1) development of manufacturing technology for high calorie gas for residential use and development of inexpensive hydrogen gas based on heavy oil residue as raw materials and 2) research related to a variety of effective uses of heavy oil residue.

In order to avoid an energy gap in the middle period from the late 1980's to the 1990's, it will be necessary to promote the development of already existing petroleum products or new fuel oils which resemble them without using crude oil as a base. A cooperative study association was set up for this purpose in June 1980, to research new fuel development technology. It is made up of a total of 23 companies in the oil refining, fermentation, plant manufacturing, and chemical industries. Rapid realisation of goals is expected under a 7-year plan. Under this national project, the following types of technology are being developed: 1) manufacturing technology for synthetic alcohol and synthetic hydrocarbon oils which use natural gas and associated gases as raw materials, 2) manufacturing technology for extracting petroleum from oil sand and oil shale, and 3) technology for effective use as fuel of biomass resources, which can be reproduced. Continuing from 1980, this technological development will be carried on energetically in 1981. Research will continue on all aspects of the introduction of new fuels, with respect to economy, possibility of stable supply, possibility of maintaining volume, and effects on the environment caused by the use of the new fuel. These studies will be made on 1) the use of fuels made by mixing alcohol with gasoline, 2) the use of mass produced biomass resources, and 3) the use of fuels from overseas methanol projects.

## Preparation of Petroleum Distribution Measures

In order to maintain proper distribution of petroleum, it is important to continuously get a fix on actual conditions of petroleum product sales and consumption. Therefore, in 1981, the following surveys will be made: 1) a survey of conditions among petroleum product dealers, 2) a survey of conditions among LPG dealers, 3) a survey of the status of petroleum product consumption, and 4) a survey of the status of automobile fuel (gasoline) consumption.

It is also necessary to prepare a system to prevent confusion due to bottlenecks occurring at the distribution stage. Therefore, a system will be set up to ascertain conditions of stocking, sales, and inventory by product and by region quickly, accurately, and regularly. By creating this kind of system, the best possible response can be made promptly when there is an abnormal movement in petroleum supply and demand and disorder can be prevented before it occurs.

For this reason, in 1980, 3,666 petroleum product outlets were designated as cooperating dealers for provision of petroleum distribution information. Under the system established, reports will be received from these cooperating dealers on 1) supply volume, 2) sales volume, and 3) inventory of gasoline, kerosene, light oil, and A-type heavy oil. This data will be collected by region.

In addition to obtaining information on the actual state of distribution and consumption as mentioned above, it is necessary to maintain close contact with regional utilities which make initial contact with the consumer and to ascertain rational and proper behavior from end-retail outlets and consumers in order to maintain proper distribution of petroleum products within the country and to avoid confusion in distribution when the supply and demand situation for petroleum is tight. For this, it is essential to actively disseminate information on petroleum conditions in ordinary times and cultivate accurate knowledge and awareness of the petroleum situation among consumers and heads of administrative organs.

For this purpose, in 1981 lectures on petroleum distribution and other subjects will be held in all metropolitan and prefectural districts for general consumers and for employees of regional public utilities. In addition, films and pamphlets will be produced and distributed to spread information about petroleum.

## Strengthening of Policies for Expedient Procurement of Sites for Electric Power Plants

In Japan, electric power as a percent of total energy usage at present is higher than it is in the advanced countries of Europe and America, representing about one-third of total usage. In achieving energy security in Japan from now on, the maintenance of a stable supply of electric power is no less important than the maintenance of primary energy sources such as petroleum. At present, electric power consumption in Japan is 529.1 billion kWh overall with a maximum daily consumption of 91.36 million kW. These figures will continue to grow at a steady pace.

In last year's IEA ministerial conference and summit meetings, a prohibition in principle of new establishment of petroleum-fired generating facilities was advocated. This has become an international demand. Especially in Japan, with its high dependence on petroleum, the promotion of nonpetroleum sources of electric power is an urgent issue.

As the domestic and foreign energy situation becomes ever more severe, securing sites for electric power plants to shoulder the future burden of electrical power supply has become extremely difficult in recent years. This trend is especially evident with respect to nuclear and coal-fired power which are expected to be most effective as nonpetroleum sources of electric power. If this situation continues, there is fear that the supply of electric power will not meet demand in some regions in the near future.

The cause of the recent setbacks in procurement of electric power plant sites is mainly the increased time required for obtaining local acceptance and the difficulty involved. Some of the reasons that can be given for this are 1) concern over safety and environmental problems, 2) lack of direct advantages to the local people, 3) the fact that the existence of power plants has no connection with industrial development or local development in the area, and 4) lack of understanding by local people of the energy problem and problems of power plant site procurement.

To cope with this situation, the government has advanced various measures to promote establishment of power plants. Specifically, it has instituted a system of grants for promotion of power plant locations, public acceptance of measures to increase understanding by the local people of power plant locations, and has stepped up measures for preservation of the environment and for safety in the vicinity of power plants.

However, when we consider the importance of a stable supply of electrical power and the recent status of progress in power plant establishment, we find it necessary to improve on present measures as well as create policies at every level to promote establishment of power plants in the future.

From this viewpoint, the background and content of the measures proposed by MITI to be executed as new policies beginning next year are summarized below.

## Dramatic Improvement in Local Welfare Measures

There is a trend in recent years toward an increase in obstacles to establishment of electric power sources. Local governments and people who have previously been cooperative are asking the national government for very strong measures to restore benefits to the area around the power source location. This is because there has been little advantage to the local area from establishment of power plants, nor has it contributed to industrial development or public welfare. There is a somewhat higher cost for electric power in the prefectures where the power plants are located compared to the prefectures where it is consumed. Also, a system has been introduced in France in which the cost of power differs according to region.

Because of this, measures to improve local welfare and increase local understanding will be greatly strengthened and expanded while the effects of present measures to promote procurement of electric power plant sites are studied. The four following grant systems will be established.

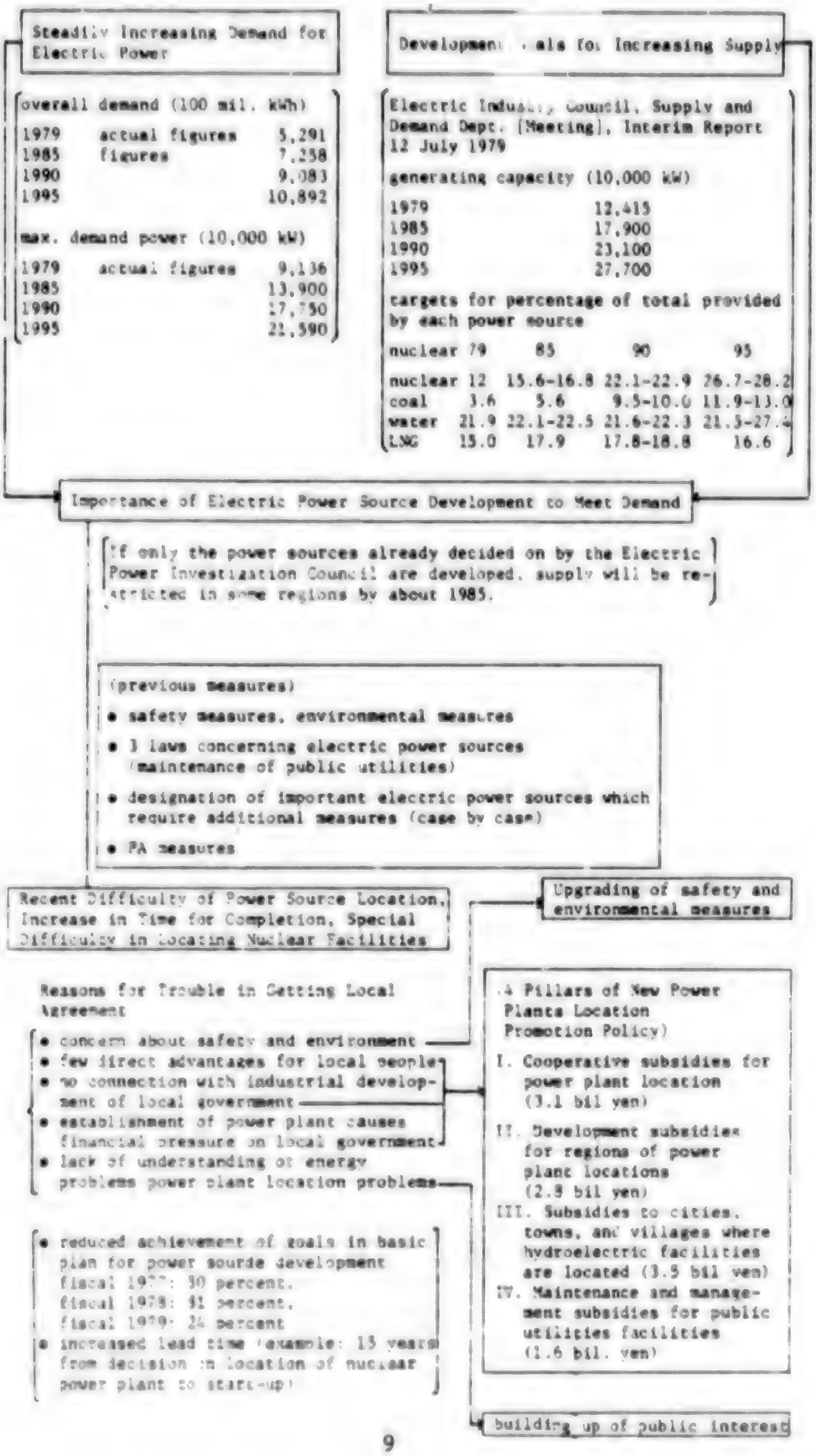
### (1) Creation of Subsidies for Maintenance and Management of Public Utilities; Assistance in Maintenance and Management Expenses (1.578 billion yen)

(Background) The present subsidy system used as a means of improving the welfare of the local people is only applied to the installation of public utility facilities and does not assist in maintenance and management costs after installation.

Promoting the creation of public utilities facilities naturally causes an increase in the maintenance and management cost burden and is a great factor in financial pressure on the city, town, or village.

Also, once the power plant begins operating, the fixed assets tax revenues to the local government decrease greatly after a certain time period and the subsequent long-term maintenance and management costs for the public facilities become a great burden on the local city, town, or village.

Table 1. Outline of Policy To Promote Procurement of New Electrical Power Plant Sites



Steadily Increasing Demand for Electric Power

overall demand (100 mil. kWh)

| | | |
|---|---|---|
| 1979 | actual figures | 5,291 |
| 1985 | figures | 7,258 |
| 1990 | | 9,083 |
| 1995 | | 10,892 |

max. demand power (10,000 kW)

| | | |
|---|---|---|
| 1979 | actual figures | 9,136 |
| 1985 | | 13,900 |
| 1990 | | 17,750 |
| 1995 | | 21,590 |

Development Goals for Increasing Supply

Electric Industry Council, Supply and Demand Dept. [Meeting], Interim Report 12 July 1979

generating capacity (10,000 kW)

| | |
|---|---|
| 1979 | 12,415 |
| 1985 | 17,900 |
| 1990 | 23,100 |
| 1995 | 27,700 |

targets for percentage of total provided by each power source

| nuclear | 79 | 85 | 90 | 95 |
|---|---|---|---|---|
| nuclear | 12 | 15.6-16.8 | 22.1-22.9 | 26.7-28.2 |
| coal | 3.6 | 5.6 | 9.5-10.0 | 11.9-13.0 |
| water | 21.9 | 22.1-22.5 | 21.6-22.3 | 21.5-27.4 |
| LNG | 15.0 | 17.9 | 17.8-18.8 | 16.6 |

Importance of Electric Power Source Development to Meet Demand

If only the power sources already decided on by the Electric Power Investigation Council are developed, supply will be restricted in some regions by about 1985.

(previous measures)

- safety measures, environmental measures
- 3 laws concerning electric power sources (maintenance of public utilities)
- designation of important electric power sources which require additional measures (case by case)
- PA measures

Recent Difficulty of Power Source Location, Increase in Time for Completion, Special Difficulty in Locating Nuclear Facilities

Reasons for Trouble in Getting Local Agreement

- concern about safety and environment
- few direct advantages for local people
- no connection with industrial development of local government
- establishment of power plant causes financial pressure on local government
- lack of understanding of energy problems power plant location problems

- reduced achievement of goals in basic plan for power sourde development
  fiscal 1977: 30 percent.
  fiscal 1978: 31 percent.
  fiscal 1979: 24 percent
- increased lead time (example: 15 years from decision on location of nuclear power plant to start-up)

Upgrading of safety and environmental measures

(4 Pillars of New Power Plants Location Promotion Policy)

I. Cooperative subsidies for power plant location (3.1 bil yen)
II. Development subsidies for regions of power plant locations (2.8 bil yen)
III. Subsidies to cities, towns, and villages where hydroelectric facilities are located (3.5 bil yen)
IV. Maintenance and management subsidies for public utilities facilities (1.6 bil. yen)

building up of public interest

(Outline of System) In view of the fact that maintenance and management expenses for public utilities facilities created in conjunction with the establishment of electric power plants are putting financial pressure on cities, towns, and villages in the vicinity of electric power plants, a maintenance and management cost subsidy system shall be established to promote the stability of these cities, towns, or villages and help expedite establishment of the electric power plants.

1. This subsidy shall apply to maintenance and management costs for public facilities built under an electric power source location promotion subsidy (hereafter called location subsidy).

2. The amount of the subsidy shall be 1.5 percent (annually) of the location subsidy and it shall be paid for a period of 15 years.

3. The subsidy shall be paid beginning in the year following the decision to grant the location subsidy. (It will be paid beginning in 1981 for cases in which the location subsidy decision was made prior to 1980.)

4. The governor of the metropolitan area, prefecture, or Hokkaido shall prepare a public utility maintenance and management plan based on the proposed plan of the mayor, town manager, or village headman and receive the approval of the minister of international trade and industry.

5. The subsidy shall be made to the municipal area, prefecture, or Hokkaido and distributed by the municipal area, prefecture, or Hokkaido to the city, town or village.

(2) Creation of Electric Power Source Location Regional Development Subsidy Regional Development Measures in Power Plant Regions (2.75 billion yen)

(Background) In order to promote establishment of electric power sources, the improved welfare of the people of the region was previously sought by building public utility facilities in the vicinity of the power plant by means of a location promotion subsidy.

However, in reality, development in regions with existing electric power sources did not expand, and dissatisfaction on the part of local governments grew tremendously. This dissatisfaction is especially strong in regions where electric power is taken out of the region on a large scale. In view of the importance of the local prefecture in establishing electric power sources, it is absolutely necessary to supplement the expenses for regional development in regions where electric power sources are located and where electric power is removed from the prefecture on a large scale and the need for regional development is objectively recognised.

(Outline of System) An electric power source location regional development subsidy system shall be established for development of industry in the region where the electric power source is located by promotion of local development, for example, by local hiring.

1. This subsidy shall apply to costs of preparing plans for regional development operating expenses for industrial development (attraction of industry, preparation of sites for industrial use, interest supplements for industrial parks created in conjunction with the electric power source, or fishing or agriculture promotion, performed by regional development public corporations), or expenses for promotion of employment (technical training, improvement of living environment of workers) which are performed by the prefecture.

2. The subsidy shall be paid to prefectures which meet the following two conditions.

(a) prefectures in which the amount of electric power generated in the prefecture is more than 1.5 times the electric power consumed in the prefecture (including prefectures which will clearly meet this condition when power generation facilities now under construction go into operation).

(b) prefectures which come under Article 2 of the Enforcement Order of the Industrial Placement Law or prefectures in which the total area of "protruding" guidance regions in the prefecture, as defined in attached Table 2, is more than 50 percent of the total area of the prefecture.

Table 2.

| Unit cost (share for city, town, or village with electric power plants) | classification of facility capacity | local residents | industry etc. |
|---|---|---|---|
| | 1 million kW or less | 400 yen per household monthly | 100 yen per kW of power contracted for monthly |
| | 1-2 | 500 " | 125 " |
| | 2-3 | 600 " | 150 " |
| | 3-4 | 700 " | 175 " |
| | 4-5 | 800 " | 200 " |
| | 5-6 | 900 " | 225 " |
| | 6 million kW or more | 1,000 " | 250 " |

Share for neighboring cities, towns, or village shall be one-half the share for the city, town, or village with electric power plants.

3. The amount of the subsidy shall be a fixed amount (from 50 million yen to 400 million yen per prefecture) corresponding to the category of the volume of electric power removed (remainder of power consumed in prefecture subtracted from power generated).

Furthermore, cities, towns, and villages where a nuclear or coal-fired power plant (including those under construction) is located shall be designated as special guidance regions and preferred treatment such as increased amounts of industrial relocation assistance funds shall be provided (from the General Account: Industrial Relocation Promotion Cost Assistance Fund, 5.913 billion yen).

(3) Creation of Subsidy to Cities, Towns, or Villages Where Hydroelectric Facilities Are Located; Assistance to Cities, Towns, and Villages With Hydroelectric Facilities (3.5 billion yen)

(Background) Hydroelectric power generation is Japan's greatest purely domestic source of energy. It constitutes 22 percent of our total electric power source facilities and is a very important power generation source. According to the report (August 1979) of the Supply and Demand Section of the Comprehensive Energy Investigation Board, it is necessary to expand the scale to 30 million kW of ordinary hydroelectric power and 3.35 million kW of pumped hydroelectric power. However, cities, towns, and villages which have cooperated with hydroelectric development for a long time are suffering from increases in financial demands from measures to alleviate the effects of advancing depopulation due to inundation and the reduced function of rivers and streams in low water areas.

In view of this situation and based on the strong desire of cities, towns, and villages in the vicinity of hydroelectric generation facilities, it is essential to formulate policies for already existing hydroelectric facilities to expedite establishment of new facilities in the future.

(Outline of System) In order to alleviate the effects of lowered functioning of streams and rivers due to the installation and operation of hydroelectric power plants, a subsidy will be granted to the cities, towns, or villages involved and the welfare of the local people will be sought by building facilities and thus facilitating the establishment of new hydroelectric generating facilities.

1. This subsidy shall be applied to cities, towns, and villages with hydroelectric power plants which have been operating for at least 15 years or low water areas related to such hydroelectric facilities (limited to cases in which the total output of the city, town, or village hydroelectric generating facilities is at least 1,000 kW and total volume of electrical power is at least 5 million kWh.

2. The amount of the subsidy shall be a multiple of a set unit cost for the volume of electric power generated annually and will be paid beginning in 1981.

The unit cost per kWh of electricity generated shall be 0.05 yen per kWh (0.025 yen per kWh for pumping plants).

The minimum guaranteed amount shall be 3 million yen per city, town, or village. The maximum amount shall be 30 million yen per city, town, or village.

3. The generation facilities indicated in item 1 will be excluded from receiving the subsidy 15 years after they started receiving it.

4. The subsidy shall apply to construction of facilities for improvement of local welfare such as water systems, sewage treatment facilities, transportation facilities, and public buildings.

5. This subsidy shall be paid to the metropolitan area, prefecture, or Hokkaido and distributed to the city, town, or village by the metropolitan area, prefecture, or Hokkaido.

(4) Creation of a Cooperative Subsidy for Establishment of Nuclear Power Plants; Provision of Cooperative Subsidy to Local Inhabitants (30.9 billion yen)

(Background) Compared to other sources of electric power, early and large scale development of nuclear power plants is especially needed for the following reasons: a) generation cost is very low and it would contribute greatly to stabilization of utility rates, b) generation is possible on a large scale and it would contribute greatly to stabilizing the supply of electric power, c) as the main alternate source of energy which is semi-domestic and the cornerstone of Japanese energy security, it will take on a great role in the future primary energy supply, and d) active promotion of development is advocated internationally.

However, there are problems involved in locating nuclear power plants. Specifically, a) the consensus of the local people is difficult to obtain and establishment of facilities is very difficult, b) nuclear power plants have relatively little effect on employment compared to their size and contribution to the area development is small, c) there is great dissatisfaction because even after nuclear power plants are built, there is not enough return to the local region of the benefits of low cost power generation. It is necessary to solve these problems.

In addition to the various measures used in the past for maintaining safety in nuclear facilities, a cooperative subsidy will be made to the people of the local area of a nuclear power plant with respect to the establishment of the nuclear power plant there. In this way, the advantages accompanying the establishment of the nuclear power plant will be actually returned to the people and industrial location and regional development will be promoted. Thus, improvement of local welfare and accelerated location of nuclear power plants will be promoted.

(Outline of System) By giving a cooperative subsidy to the people and industries in the vicinity of nuclear power plants, improvement of local welfare is promoted and the establishment of the nuclear generating facilities will be facilitated. Therefore, a cooperative subsidy system shall be established for location of nuclear generation facilities.

1. A cooperative grant shall be given to the people and industry of cities, towns, and villages where nuclear generating facilities are located (including those under construction) and to the people and industries of neighboring cities, towns, and villages. The base fund for this purpose shall be given to the prefecture.

2. The prefecture shall delegate the payment of the cooperative grant for people and industry to the electric power company and the electric power company shall make the payment coincident with collection of electric power charges.

3. The amount of the subsidy shall be determined as a unit cost corresponding to the facility capacity classification of the city, town, or village (the amount paid to neighboring cities, towns, or villages shall be one-half the amount paid to cities, towns, or villages in which the plant is located). It shall be a fixed amount per household for the inhabitants and correspond to contracted electric power for industries. (See Table 2.)

4. This subsidy shall go into effect in October 1981.

### Revenue Source Measure

In order to maintain a revenue source for implementing the measures of the preceding section, the Electric Power Source Development Promotion Tax (presently, of 0.3 yen per kWh, 0.085 yen per kWh goes to the local subsidy account) shall be raised (effective 1 October 1981, increase in revenue of about 9.7 billion yen).

### Upgrading of Alternative Energy Sources Policy--Alternative Energy Sources Measures Section

At the end of August last year, on the basis of the international energy situation and development in the Tokyo summit, MITI announced far-reaching improvements in its measures for alternative energy sources beginning in 1980. With a basic goal of reducing the present 75 percent dependency on imported oil to 50 percent by 1990, the announced plan included the creation of the Alternative Energy Source Development Promotion Act (tentative name), the Alternative Energy Source Public Corporation (tentative name), the Alternative Energy Source Measures Special Account (tentative name), and the Alternative Energy Source Development Promotion Tax (tentative name).

Subsequent to this, these matters were studied from many angles within the government and the result was the structure taking shape in the present policy. In the present article, the policy will be outlined and its state of progress discussed. Policies being advanced for 1981 will also be presented.

### Obtaining Revenue Sources for the Measures and Setting Up a Special Accounting System

It is estimated that funds of 1,000 billion yen will be required by 1990 for carrying out measures to develop alternative energy sources. In order to maintain long-term stable funding, measures must be taken to acquire revenue sources. Therefore, the Electric Power Source Development Promotion Tax was given expanded application (by creating the Electric Power Source Diversification Account), tax rates were increased (from 0.085 yen per kWh to 0.3 yen per kWh), and application of the Petroleum Tax was expanded (from petroleum measures to petroleum and alternative energy source measures).

In addition to these tax system changes, this tax revenue will be considered revenue for appropriation in the budget for the alternative energy source measures and a special account system is being set up for accounting of this revenue and expenditure separate from the General Account.

The Electric Power Source Measures Special Account will be reorganized and expanded to create a new account, the Electric Power Source Diversification Account, for posting of accounts related to power generation with alternative energy sources (the so-called electric power source diversification measures). (Accounting transactions for the previously instituted electric power source location measures will be posted in the Electric Power Source Location Account.) For other alternative energy source measures, the Coal and Petroleum Measure Special Account will be revised and expanded and the name of the special account will be changed to the Coal, Petroleum, and Alternative Energy Source Special Account, and the Petroleum Account will be changed to the Petroleum and Alternative Energy Source Account (hereafter called the Petroleum and Alternative Account). Items related to alternative energy source measures will be posted in these accounts. The Electric Power Source Development Promotion Tax revenues and the Petroleum Tax revenues will be used as revenue sources.

The alternative energy source appropriated for the two special accounts in 1980 is 82.7 billion yen (including the Science and Technology Agency segment) in the Electric Power Source Diversification Account and 34.9 billion yen for the alternative energy source segment of the Petroleum and Alternative Energy Source Account for a total of 117.6 billion yen.

The year 1981 has been set as the year when the measures funded in the 1980 budget will be seriously expanded toward achieving the targets for development and introduction of alternative energy sources, the supply goals and application guidelines discussed in the following section. In the Petroleum and Alternative Account, 88.6 billion yen or 2.5 times the amount for 1980 are requested for alternative energy source measures and 104.9 billion yen or a 26.7 percent increase over 1980 are requested for the Electric Power Diversification Account (including the Science and Technology Agency segment) for a total of 193.5 billion yen (an increase of 64.5 percent over the previous year). (Details given in a separate section.)

Establishment and Enforcement of the Law Concerning Promotion of Development and Application of Alternative Energy Sources

(1) It is necessary to establish a legal framework extending to both supply and demand for comprehensive and effective promotion of the development and application of alternative energy sources which has previously been done in a scattered fashion by many different individuals for each type of energy. Therefore, supply goals and application guidelines for alternative energy sources will be set for businessmen and, concurrently, an organization for comprehensive development of new energy will be established as a parent body for promotion of alternative energy source development. These necessary measures for advancing comprehensive development and application of alternative energy sources are

included in the Law Concerning Promotion of Development and Application of Alternative Energy Sources (hereafter called the Alternative Energy Source Law) which was submitted as a bill in the last regular session of the Diet and made into law.

(2) Work is proceeding rapidly on the formulation of supply goals and application guidelines, which are an important part of the measures in the Alternative Energy Source Law, and public announcement is scheduled for this fall. Here we will discuss the significance of these measures and the policy guidelines for their evaluation.

1. Supply Goals for Alternative Energy Sources

Supply goals for alternative energy sources to be developed and used will be determined and officially announced by the minister of international trade and industry on the basis of a cabinet resolution with a view to maintaining a comprehensive energy supply. Alternative energy sources vary widely in characteristic features, uses, and feasibility of supply, so these supply goals are necessary for efficient and effective development and application of thse energy sources and maintenance of necessary volume.

Maintenance of a supply of alternative energy sources is believed to hold great significance for the future of our economic society, and changes in the energy supply and demand structure will bring about a variety of changes in the social system. Therefore, it is necessary that policies be formulated in concert by all parts of the administration for the introduction of alternative energy sources so the matter will be ultimately determined by a resolution of the Cabinet. Once a Cabinet resolution is made the entire government will work toward the achievement of the goal.

It is a policy to set the supply goals on the basis of the "Tentative Forecast of Long-Range Energy Supply and Demand" (on the assumption that the present 75 percent dependency on petroleum will be reduced to 50 percent 10 years from now in 1990). An in-depth feasibility study will be made on the basis of the framework of this tentative forecast. On the basis of the results, the necessary government policy measures and actual figures for supply goals will be put together.

2. Guidelines for Application of Alternative Energy Sources

The minister of international trade and industry will consider the supply status and level of technology for alternative energy sources and determine guidelines for business and industry concerning the types of alternative energy sources to be introduced and the means of introduction in order to promote the application of synthetic fuels in factories and places of business. Also, the minister of international trade and industry and the cabinet ministers with jurisdiction over places of business will provide guidance and advice to businessmen as necessary with regard to the matters determined in these application guidelines. The application guidelines show types of alternate energy sources which should be introduced and the method of introduction for industrial categories where there is a high rate of petroleum consumption. They are central measures, related to demand, on the basis of which advice and guidance will be given.

The application guidelines are basic and general, and should be interpreted flexibly under special circumstances for separate cases in individual businesses. But as a rough standard for providing guidance and advice they must be based on and reflect the actual circumstances of industry, especially industries with large petroleum consumption such as steel, cement, and aluminum. On the basis of these points, we are presently formulating the application guidelines, with the cooperation of related industries, which will accurately incorporate the actual circumstances of industries which are large energy consumers.

## Establishment of the Organization for the Comprehensive Development of New Energy

The development and introduction of new energy often requires technological development which is not possible on a commercial basis or cannot be carried out alone by the private sector. Therefore, in order to promote vigorous and effective development and introduction of alternative energy sources, it is necessary to establish a central organization to bring together knowledge and technology from all quarters and apply it comprehensively and efficiently to technological development, and take measures to assist in the development of such areas as geothermal energy which cannot be handled by previously existing organs. Due to these considerations, the Organization for the Comprehensive Development of New Energy (hereafter called the new organization) was established (on 1 October 1980) as a special corporate entity under the Petroleum and Alternative Law.

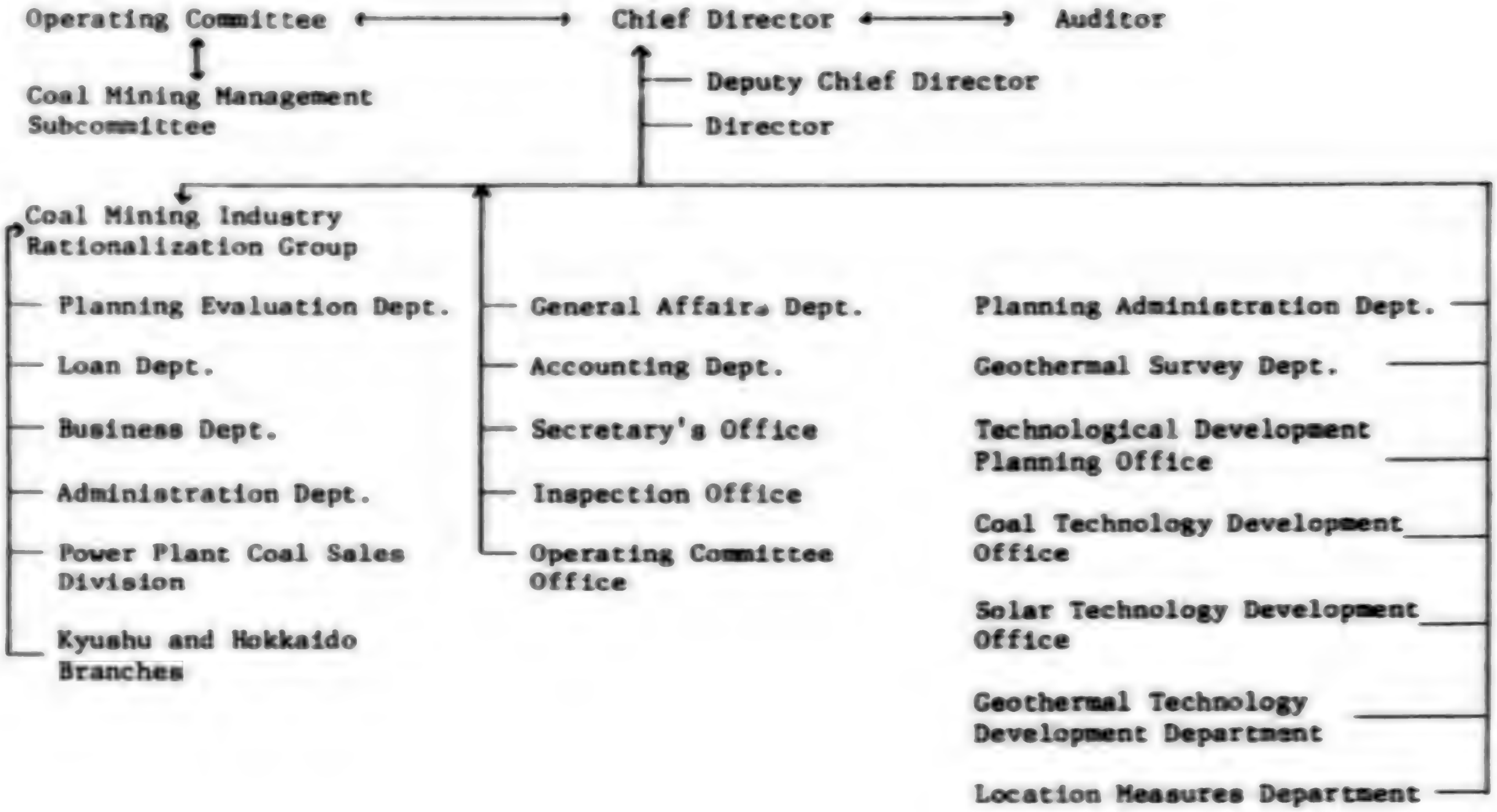
The chief functions to be performed by the new organization are: first, development of new energy technology (technology development for coal liquefaction, electricity generation by warm water and solar heat, etc), second, geothermal resource development (loan guarantees for development funds, geologic structure surveys, etc), and third, overseas coal development (loans to finance exploration, loan guarantees for development funds, geologic structure surveys, etc). The scale of activity for the first year (a 6-month segment) will be 17.6 billion yen and, including related budget (for continued undertakings which were carried out by other organizations before the new organization was established and are scheduled to be carried out by the new organization from 1981 on), 36.5 billion yen.

Furthermore, in 1981, an increase of 3.7 times the amount for the previous year or 65.3 billion yen is requested due to the addition of new functions and normalization of operations.

Also, along with the establishment of the new organization, the Coal Mining Industry Rationalization Corporation will be dissolved and the new organization will take over the functions of coal mining rationalization previously carried out by the corporation.

The new organization will be managed by an operating committee made up of knowledgeable private citizens and it will take a flexible posture, receiving the loan of experts from the private sector so that private creativity and inventiveness can be utilized. It is expected that the new energy development functions will be carried out smoothly and efficiently.

For Reference: Organization for the Comprehensive Development of New Energy


Operating Committee
Chief Director
Auditor
Coal Mining Management Subcommittee
Deputy Chief Director
Director
Coal Mining Industry Rationalization Group
Planning Evaluation Dept.
Loan Dept.
Business Dept.
Administration Dept.
Power Plant Coal Sales Division
Kyushu and Hokkaido Branches
General Affairs Dept.
Accounting Dept.
Secretary's Office
Inspection Office
Operating Committee Office
Planning Administration Dept.
Geothermal Survey Dept.
Technological Development Planning Office
Coal Technology Development Office
Solar Technology Development Office
Geothermal Technology Development Department
Location Measures Department

## Upgrading of Alternative Energy Source Measures

Preparation of the framework for carrying out the measures explained in the foregoing section is moving ahead steadily. Important features of the measures for application and promotion of these systems and organizations in 1981 are explained below.

### (1) Promotion of Alternative Energy Source Development and Stable Supplies

### 1. Creation of a Foreign Coal Supply System

In order to obtain a stable supply of foreign coal in response to the increasing demand for coal in Japan, it is necessary to rapidly establish a coordinated system for the supply of foreign coal (a coal chain) including coal mine development in coal producing countries, infrastructure preparation, and coal center construction. For this purpose, various types of assistance will be provided through the new organization for exploration and development of foreign coal and necessary measures will be taken to assist construction of a coal center in order to promote the development and import of foreign coal.

### 2. Promotion of Electricity Generation by Nuclear Power

In order to promote a firmer establishment of light water reactors and the practical application of new highly fuel-efficient reactors, modification and standardization of light water reactors and proof tests for technology used in modifying light water reactors will be carried out for the purpose of achieving a greater reliability of the Japanese-made light water reactors, and surveys will be made on the practical application of new fuel efficient reactors such as the fast breeder reactor.

### 3. Establishment of a Nuclear Fuel Cycle

In order to establish a nuclear fuel cycle, which is the basis for nuclear development, early and independently, a second reprocessing plant will be constructed, with 1990 as the target year for beginning operations. In addition, an effort will be made to maintain a stable supply of uranium resources and enrichment functions and a system for treating and disposing of radioactive waste.

### 4. Promotion of LNG Development

In order to increase the demand for LNG, an effort will be made to promote the exploration and development of natural gas, to establish LNG projects overseas and to introduce LNG for industrial use.

### 5. Promotion of Development and Use of Local Energy

As a means of quantitatively supplementing the existing large scale energy supply system, local energy resources which have previously been left unused such as solar, geothermal, wind, and biomass resources must be actively developed and used according to actual conditions of the regional energy demand. For this purpose, local energy measures will be stepped up tremendously. Comprehensive measures to be carried out will include the following: (i) promotion of basic surveys, (ii) promotion of commercialization, (iii) promotion of technological development, and (iv) promotion of education and dissemination of information.

6. Promotion of Technological Development for Alternative Sources of Energy

There will be active promotion of technological development for alternative sources of energy including coal processing technology such as liquefaction and gasification of coal and COM (coal and oil mixture), solar heat and photoelectric generation technology, geothermal energy technology such as the use of hot water for power generation and deep strata hot water supply systems, and hydrogen energy technology.

(2) Acceleration of Energy Conversion

1. In order to accelerate conversion to coal, LNG, etc, energy sources in industry, there will be an expansion and strengthening of financial and tax measures.

2. In order to accelerate the widespread use of solar systems which use clean and inexhaustible solar energy, there will be a strengthening and expansion of assistance measures such as low interest loans for private housing and industrial facilities and aid for public facilities.

3. By promoting the dissemination of gas air conditioning equipment, the seasonal demand for electrical and gas service will be evened out to achieve conservation in oil consumption and accelerate the introduction of LNG. In addition, the summer peak problem for electrical power will be alleviated and equipment efficiency will be improved.

(3) Getting Free From Petroleum as a Source of Electrical Power

1. Promotion of Coal-Fired Power Plant Construction

In response to the domestic and foreign appeal for reduction of the use of petroleum fired power plants, exemplified by the IEA and summit meeting agreements, efforts will be made to promote the construction of coal-fired power plants and a conversion of existing petroleum-fired plants to coal. For this purpose, basic preparations will be made to expedite the use of coal such as proving our technology for environmental preservation measures and establishment of technology for fuel conversion of petroleum-fired plants. For this purpose, a subsidy system will be established.

2. Promotion of Safety Measures for Nuclear Power Generation

In order to maintain greater safety in nuclear power plants, the operation and control systems will be upgraded by improving the safety inspection function, preparation of technology standards, and permanent stationing of operation and control experts. Also, a study will be made of measures to improve skills of operators and technicians.

In addition, proof tests will be carried out on the automatic testing equipment to minimize exposure of operators to danger and make better preparations for prevention of disaster or accidents in atomic power plants.

### 3. Promotion of Hydroelectric Development

Water is a precious domestic energy resource and in order to promote the development of water power with its capacity of unlimited circulation, an effort will be made to carry out surveys for drawing up a plan for hydroelectric power plant location and reinforce and expand policies to assist hydroelectric development.

### 4. Promotion of Geothermal Development

In order to promote geothermal development by private industry, the government will take the lead in conducting surveys and formulating incentive and assistance measures. In addition, measures will be taken to establish technology for environmental preservation and safety, which have been technological bottlenecks.

In the foregoing, we have attempted to present the status of policies for developing alternative energy sources. As symbolized by the Venice summit, the energy problem is the greatest immediate problem facing the countries of the world. The introduction of alternative energy sources is particularly key to success in reducing our dependence on oil. Beginning this year, as described in this article, MITI will undertake a dramatic improvement in its policies for developing alternative energy sources. Necessary legislation has been passed in the Diet (May 1980), the Organization for the Comprehensive Development of New Energy has been established (1 October), and supply goals and application guidelines are being set (scheduled for this fall). While fully utilizing the overall framework for execution of these policies, an effort will be made to further improve individual measures.

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CSO: 8129/0367

## ESTIMATE OF 1981 SPACE DEVELOPMENT BUDGET COMPILED

Tokyo UCHU KAIHATSU IINKAI GEPPO in Japanese Jul-Aug-Sep 80 pp 16-23

[Material on the budget submitted by the Japan Space Development Committee, including basic policy formulations and projects for 1981: "On the Estimate of 1981 Space Development Expenses." Compiled by the Space Development Committee, 29 August 1980]

[Text] The estimate of the 1981 Space Development Budget is as follows:

### I. Basic Policy

The basic policy of the 1981 Space Development Budget is as follows:

1. To develop No 10 Science Satellite (PLANET-A), to be launched into a solar orbit in 1984 by M-3S Revised I Rocket, for the purpose of studying interplanetary plasma, located within the earth's orbit, and observing Halley's Comet within the ultraviolet region.

2. To develop No 11 Science Satellite (ASTRO-C), to be launched in 1985 into a circular orbit at an altitude of 5,000 km by M-3S Revised I Rocket, for the purpose of observing x-ray sources in the nucleus of an active gallaxy and for detailed observation of x-ray celestial bodies.

3. To develop M-3S Revised I Rocket for launching No 10 Science Satellite (PLANET-A) and No 11 Science Satellite (ASTRO-C) by improving the 2nd and 3rd stage motors of the M-3S Rocket and by revising the 1st stage auxiliary rocket.

4. To develop N-II Rocket No 7 (two-stage) and No 8 for the purposes of launching Marine Observation Satellite No 1 (MOS-1) and Broadcasting Satellite No 2-b (BS-2b).

5. In order to respond to demands in Japan for launching satellites during the decade between 1985-1995, we will develop the application of engines that utilize liquid oxygen and liquid hydrogen as propellants and also develop a high-precision guidance control system. Furthermore, based on the results of rocket developments available to us at present, we will develop H-I Rockets capable of launching stationary satellites weighing about 550 kg. Further still, in order to meet our goals of launching [satellites] in 1985-1995, we will develop H-I 2-stage Test Rockets.

6. Considering the progresses made [thus far] in the development of the Engineering Testing Satellite Model III (ETS-III) and in order to ensure its successful launch, its target year for launching will be extended from 1981 to 1982.

7. To develop Earth Resources Satellite No 1 (ERS-1), to be launched by H-I Rocket (two stage), for the principal purposes of establishing active observation technology and for exploration of the earth's resources, as well as for the [secondary] purposes of land survey, agriculture-forestry-fishery, environmental protection, prevention of [natural] disasters, and coastal observation.

In particular, to promote active research on synthetic open ended [Kaiko] radars and other sensors.

8. To establish the technology relevant to the spin-type stationary satellite, and to conduct research and develop Aviation-Marine Engineering Satellites (AMES), for the purpose of developing technologies for nonstationary communication satellites and navigation satellites.

9. To research and develop experimental systems and on-board experiment facilities to be used for First Material Proving Tests (FMPT), for the purposes of enabling Japanese scientists on board the space shuttle to conduct various space experiments, such as those of materials, that utilize special characteristics of space, and to train these scientists.

10. To conduct a system planning, etc., for the purpose of constructing a new launch site for H-I Rockets.

11. Promotion of projects other than those listed above will be in accordance with the Space Development Project (approved 1979).

## II. Contents of the Project

Based on the [aforementioned] Basic Policy (I), major projects and their necessary preparations for 1981 are as follows:

### 1. Promotion of Developments in Scientific Fields

(1) Development of No 8 Science Satellite (ASTRO-B)

Promote the development of a flight model for No 8 Science Satellite (ASTRO-B).

(2) Development of No 9 Science Satellite (EXOS-C)

Develop a flight model for No 9 Science Satellite (EXOS-C).

(3) Development of No 10 Science Satellite (PLANET-A)

Develop a prototype model for No 10 Science Satellite (PLANET-A).

(4) Development of No 11 Science Satellite (ASTRO-C)

Develop a prototype model for No 11 Science Satellite (ASTRO-C).

(5) Space science experiments utilizing particle accelerator (SEPAC)

Promote development of a flight model of the test equipment to be used in the space shuttle for space science experiments utilizing particle accelerator (SEPAC).

2. Promotion of Developments in the Area of Observation

(1) Development and launching of Stationary Meteorological Satellite (GMS-2)

Promote development of a proto flight model and a flight model of the Stationary Meteorological Satellite (GMS-2) to be launched by N-II Rocket No 2.

(2) Development of Marine Observation Satellite No 1 (MOS-1)

Promote basic as well as detailed designing of the Marine Observation Satellite No 1 (MOS-1), and develop its on-board observation equipment as well as its prototype.

(3) Research and development of Geodetic Satellite No 1 (GS-1)

Conduct a trial test for basic technology of development model of the Geodetic Satellite No 1 (GS-1).

(4) Research and development of Earth Resources Satellite No 1 (ERS-1)

Make a preliminary design of the Earth Resources Satellite No 1 (ERS-1), conduct a trial test for the on-board synthetic open ended radar and optical sensors, and finally conduct research on data processing and analysis technology.

(5) Research

Promote research in on-board satellite observation equipment for marine, land and electromagnetic field observations, on data processing technology, and on earth observation satellite systems.

3. Promotion of Developments in Communications Field

(1) Development of communications satellites No 2 (CS-2a and CS-2b)

Promote development of proto flight models and flight models for Communications Satellites No 2 (CS-2a and CS-2b).

(2) Development of Broadcasting Satellites No 2 (BS-2a and BS-2b)

Promote basic as well as detailed design of the Broadcasting Satellites No 2 (BS-2a and BS-2b), and develop their proto flight models.

(3) Research and development of Aviation-Marine Engineering Satellites (AMES)

Plan preliminary designs for Aviation-Marine Engineering Satellites (AMES) and conduct trial tests of satellite systems and on-board experiment equipment.

### (4) Research

Along with the promotion of research on multi-beam antennae for satellites, carry out research on mili-wave band satellite communications technology, search and rescue communications system using satellites, and practical satellites of the second generation.

## 4. Promotion of Developments in the Area of Space Experiments

### (1) Material Proving Test (MP/TT-500A) by a small rocket

Develop a small-scale material manufacturing and testing system and conduct experiments using TT-500 A rocket.

### (2) Research and development of the experiment system on board the space shuttle, to be used for the First Material Proving Test (FMPT)

Along with a preliminary design for the experiment system on board the space shuttle, trial test the system and prepare a program to train the scientists and engineers who will board the shuttle.

## 5. Promotion of Developments in the Field of Satellite Related Engineering

### (1) Development of Engineering Test Satellite Model III (ETS-III)

Promote development of a proto type model and a flight model for the Engineering Test Satellite Model III (ETS-III).

### (2) Research

Promote research on the bus for large-type three-axial satellites; trial test apogee motors; and conduct research on reliability evaluation standards, highly reliable space parts, space bearings, electrically driven engine systems, and high-precision direction control system of satellite antennae using laser.

## 6. Promotion of developments in the field of transportation [i.e., rocket] related engineering

### (1) Development of M Rockets

#### ① Development of M-3S rocket

In order to launch No 8 Science Satellite (ASTRO-B), develop M-3S rocket model No 3

#### ② Development of M-3S Revised I Rocket

Conduct operational tests, such as that of structural development of the M-3S Revised I rocket and also conduct ground level combustion tests for the 1st stage anxiliary rocket and for the 2nd and 3rd stage motors.

### (2) Development of N-I Rocket

To launch Engineering Testing Satellite Model III (ETS-III), promote development of N-I Rocket Model No 6.

### (3) Development of N-II Rockets

To launch Stationary Meteorological Satellite No 2 (GMS-2), Communications Satellite No 2-a (CS-2a), Communications Satellite No 2-b (CS-2b), and Broadcasting Satellite No 2-a (BS-2a), promote developments of N-II rockets models No 2, No 3, No 4, and No 5, and, simultaneously, promote development of N-II Rocket Model No 6 as a secondary model for launching various satellites by N-II Rockets.

Also, to launch Marine Observation Satellite No 1 (MOS-1) and Broadcasting Satellite No 2-b (BS-2b), develop N-II Rocket Model No 7 (two stage) and Model No 8.

### (4) Development of H-1 Rocket

Along with promoting basic tests for developing liquid oxygen-liquid hydrogen propellants, inertia guidance system, and 3-stage solid motors, plan a preliminary and basic designs for all stages of the 500 kg class H-I Rocket, and develop its liquid oxygen-liquid hydrogen propellants.

### (5) Research

Promote research on recovery techniques, rendezvous-docking techniques, feasibility study of large type rockets, highly reliable space parts, etc.

## 7. Preparation of Facilities

### (1) Preparation of facilities needed for development of satellites and rockets

Promote preparation of testing facilities for satellites, and promote needed research, and research facilities. In addition, promote preparation of testing facilities and equipment for liquid oxygen-liquid hydrogen engines and inertia guidance system, and for receiving and processing of earth observation data. Furthermore, promote preparation of facilities and equipment necessary for development of science satellites and M rockets.

### (2) Preparation of launching facilities for satellites and rockets

Design a system for the launch pad for 500 kg-class H-I Rockets, promote preparation of radar, telemeter, and test related [matters]. Also promote preparation of the facilities for launching M Rockets.

### (3) Preparation of facilities necessary for tracking satellites

Promote preparation of a satellite tracking control system and conduct necessary research.

Furthermore, prepare a science satellite data collecting system.

### 8. Other Measures

(1) Reinforcement of research development ability

In order to encourage self-sufficiency in technology and carry out the space development [program] vigorously, the National Space Development Agency and the Tokyo University Aerospace Research Institute will be restructured into the "Space Science Research Institute" (tentative name) and its research and development will be strengthened.

Furthermore, in order to promote pioneering and basic research on satellites and rockets, and to promote research on satellite systems and on-board equipment, national testing and research institutions will be strengthened and expanded.

(2) Promotion of international cooperation

Promote participation and cooperation in space development related activities of the United Nations; cooperation with United States in promoting Japan-U.S. science engineering research development in non-energy areas and in the use of the space shuttle; and cooperation with European space agencies.

(3) Promotion of membership in the space-related international treaties

Promote membership in the three space-related treaties and accompanying domestic measures.

(4) Reinforcement of widespread educational activities

Promote public relations and educational projects necessary for space development.

(5) Training of space engineers

In order to improve the quality of space engineers, assign those involved in space development to overseas [research centers].

(6) Preparation of the foundations for promoting space development

Devise policies necessary for smooth launching of rockets.

(7) Others

Promote investigation necessary for determining appropriate development plans concerning satellites for practical application.

## III. Expenses Necessary to Execute Projects Under II

The 1981 budget estimated for executing the projects under II is attached.

A Summary of the 1981 Space Development Budget

●[illegible] (1)

（単位：千円） (2)

| [illegible] (3) | [illegible] (4) | | | [illegible] (8) | | |
|---|---|---|---|---|---|---|
| | [illegible] (5) | [illegible] (6) | [illegible] (7) | [illegible] (9) | [illegible] (10) | [illegible] |
| [illegible] (11) | ● 1,272,800<br>[illegible] 85,097,283 | | ● 1,272,800<br>[illegible] 85,097,283 | ● 8,026,000<br>[illegible] 88,263,351 | – | ● 8,026,000<br>[illegible] 88,263,351 |
| [illegible] (12) | – | 108,000 | 108,000 | – | – | 0 |
| [illegible] (13) | ● 4,501,360<br>7,656,483 | 2,711,999 | ● 4,501,360<br>10,368,482 | ● 4,096,305<br>8,081,750 | 4,004,058 | ● 4,096,305<br>12,087,808 |
| [illegible] (14) | – | 45,589 | 45,589 | – | 43,336 | 43,336 |
| [illegible] (15) | 143,061 | – | 143,061 | 2,207,334 | – | 2,207,334 |
| [illegible] (16) | 4,953 | ● 677,244<br>3,468,355 | ● 677,244<br>3,473,308 | ● 191,400<br>75,079 | 3,862,810 | ● 191,400<br>3,938,889 |
| [illegible] (17) | 313,305 | ● 1,310,834<br>2,451,075 | ● 1,310,834<br>2,764,380 | ● 1,035,300<br>463,993 | ● 1,412,851<br>2,031,673 | ● 2,447,951<br>2,495,666 |
| [illegible] (18) | – | 4,931 | 4,931 | – | 5,364 | 5,364 |
| [illegible] (19) | – | 1,504 | 1,504 | – | 2,456 | 2,456 |
| [illegible] (20) | ● 5,774,160<br>[illegible] 93,217,083 | ● 1,988,078<br>8,789,454 | ● 7,762,238<br>[illegible] 102,006,537 | ● 13,349,005<br>[illegible] 99,091,507 | ● 1,412,851<br>9,951,597 | ● 14,761,856<br>[illegible] 109,033,104 |

* [illegible] (21)

** [illegible] (22)

Key:

1. Ⓛ National Liability Action
2. (Unit: thousand yen)
3. Ministry or Agency
4. 1980 Budget
5. Space Development Related [Expenses]
6. Space Related [Expenses]
7. Total
8. 1981 Expenses
9. Space Development Related [Expenses]
10. Space Related [Expenses]
11. Science and Technology Agency
12. National Police Agency
13. Ministry of Education
14. Ministry of Agriculture, Forestry, and Fishery
15. Ministry of International Trade and Industry
16. Ministry of Transport
17. Ministry of Posts and Telecommunications
18. Ministry of Construction
19. Ministry of Home Affairs
20. Total
21. Space related expenses (estimates other than those set by the Space Development Committee) are earmarked for reference only.
22. For expenses of the National Space Development Agency, only the amount financed by the government and government subsidies are earmarked.

## A Summary of the 1981 Space Development Budget
## (Estimated by the Space Development Committee)

(9) (単位：千円)

| [illegible] (1) | [illegible] (2) | [illegible] (3) | [illegible] (4) | [illegible] (5) | [illegible] (6) | [illegible] (7) | [illegible] (8) |
|---|---|---|---|---|---|---|---|
| [illegible] (10) | [illegible] (11) | [illegible] (12) | 44,904 | 44,905 | [illegible] (13) | 44,905( | 44,904) |
| | | [illegible] (14) | 37,873 | 40,116 | [illegible] (15) | 40,116( | 37,873) |
| | | [illegible] (16) | 30,248 | 30,248 | [illegible] (17) | 30,248( | 30,248) |
| | | [illegible] (18) | 416,100 | 435,970 | [illegible] (19) | 435,970( | 416,100) |
| | | 小 計(20) | 529,224 | 541,239 | | | |
| | [illegible] (21) | [illegible] (22) | 7,598 | 7,598 | [illegible] (23) | 7,598( | 7,598) |
| | [illegible] (24) | [illegible] (25) | 833,460 | 821,514 | [illegible] (26) | 112,100( | 140,562) |
| | | | | | [illegible] (27) | 5,400( | 0) |
| | | | | | [illegible] (28) | 63,700( | 17,864) |
| | | | | | [illegible] (29) | 33,593( | 67,513) |
| | | | | | [illegible] (30) | 607,721( | 607,721) |
| | [illegible] (31) | [illegible] (32) | ●81,272,800<br>63,737,000 | ●93,824,000<br>85,883,000 | 収 入 (33) | 100,615,511( | 91,243,894) |
| | | | | | [illegible] (34) | ●93,824,000<br>79,807,000 | ●81,272,800<br>77,235,000) |
| | | | | | [illegible] (35) | 7,076,000( | 6,003,000) |
| | | | | | [illegible] (36) | 13,732,511( | 8,005,894) |
| | | | | | ([illegible] 12,710,442 を含む。)(37) | | |
| | | | | | 支 出 (38) | 100,615,511( | 91,243,894) |
| | | | | | ロケット[illegible] (39) | ●35,594,100<br>28,573,853 | ●35,443,000<br>27,998,214) |
| | | | | | [うちH-Iロケットの[illegible] (40) | ●20,292,300<br>11,504,278 | ●3,508,100<br>6,680,284)] |
| | | | | | 人工[illegible] (41) | ●44,513,300<br>27,910,482 | ●32,305,600<br>30,109,299) |
| | | | | | [うち[illegible] (42) | ● 700,000<br>1,155,356 | |
| | | | | | [illegible] (43) | ●2,730,800<br>552,486 | |

[Key on following page]

Key:

1. Ministry/Agency
2. Organs in charge
3. Item
4. 1980 Budget
5. 1981 Expenses
6. Major Expenses
7. 1981 Expenses
8. 1980 Budget
9. (Unit: thousand yen)
10. Science and Technology Agency
11. Research Coordinating Bureau
12. Expenses needed for Space Development Committee
13. Space Development Committee working expenses, etc.
14. General administrative expenses
15. Space development promotions, etc.
16. Expenses needed for improving the quality of science engineers
17. Overseas tours by space development personnel
18. Expenses needed for counter-measure activities for Tanegashim Island vicinity fishery
19. Subsidies for counter-measure activities for Tanegashima Island vicinity fishery
20. Sub-total
21. Promotion Bureau
22. General administrative expenses
23. Space development public relations and education
24. National Aerospace Laboratory
25. National Aerospace Laboratory expenses
26. Research on liquid oxygen-liquid hydrogen rocket engines
27. Research on satellite recovery technique
28. Research on basic satellite technology
29. Preparation of space science technology facilities
30. Computer leases, and others
31. National Space Development Agency
32. Expenses needed for financing and subsidizing National Space Development Agency
33. Income
34. Government Finance
35. Government Subsidy
36. Operational Income
37. (including income from nongovernmental sources)
38. Expenditure
39. Rocket development expenses
40. Development of H-1 rockets, only
41. Satellite development expenses
42. Preliminary design of earth resources satellite No 1; research and development of on-board sensors, only.
43. Preliminary design of aviation-marine engineering satellite; research and development of satellite systems.

（単位：千円）

| 省庁 | 担当機関 | 事項 | 昭和55年度<br>予算額 | 昭和56年度<br>概算 | 要旨 | 昭和56年度<br>概算 | 昭和55年度<br>予算額 |
|---|---|---|---|---|---|---|---|
| 科学技術庁 | 宇宙開発事業団 |  |  |  | 第一次材料実験システムの予備設計、[illegible]の研究開発等 (44) | ● 969,000<br>483,504 |  |
|  |  |  |  |  | ロケット打上げ経費 (45) | 4,947,583 | ( 4,562,585) |
|  |  |  |  |  | 種子島宇宙センター施設経費 (46) | 3,889,626 | ● 1,910,900<br>7,526,468 |
|  |  |  |  |  | うちH－1射点システム設計等 (47) | 178,479 |  |
|  |  |  |  |  | 人工衛星追跡管制経費 (48) | 8,106,737 | ● 3,309,700<br>12,357,472 |
|  |  |  |  |  | 筑波宇宙センター施設設備経費 (49) | ● 1,777,900<br>12,181,602 | ● 7,446,000<br>5,570,412 |
|  |  |  |  |  | うちH－1開発 (50) | ● 1,357,100<br>5,042,554 | ● 5,745,800<br>2,840,403 |
|  |  |  |  |  | 地球観測情報処理経費 (51) | ● 3,758,000<br>1,607,126 | ● 2,825,200<br>1,072,701 |
|  |  |  |  |  | 事業運営費 (52) | 5,724,760 | (5,052,701) |
|  |  |  |  |  | 一般管理運営費等 (53) | 7,273,960 | (7,196,542) |
|  |  | 計 (67) | ● 51,272,600<br>85,097,282 | ● 68,026,000<br>88,253,351 |  |  |  |
| 文部省 (63) | 宇宙科学研究所（仮称）(54) | 特別事業費等に必要な経費 (55) | ● 1,498,560<br>6,055,883 | ● 4,096,305<br>6,621,550 | 科学衛星研究経費 (56) | ● 4,096,305<br>3,306,121 | ● 1,498,560<br>4,112,843 |
|  |  |  |  |  | うち第10号科学衛星の開発 (57) | 420,000 |  |
|  |  |  |  |  | 第11号科学衛星の開発 (58) | 254,000 |  |
|  |  |  |  |  | Mロケット開発費 (59) | 2,367,451 | ( 1,161,700) |
|  |  |  |  |  | うちM－3S改Iロケットの開発 (60) | 708,451 |  |
|  |  |  |  |  | 液水エンジン開発の基礎研究経費 (61) | 559,203 | (344,102) |
|  |  |  |  |  | スペースシャトル計画（SEPAC）に関する参加経費 (62) | 388,775 | (437,238) |
|  |  | 大型特別機械整備費 (64) | ● 3,003,000<br>600,600 | 1,460,200 | 科学衛星打上げ用ロケット発射台等施設経費 (65) | 1,201,200 | ● 3,003,000<br>600,600 |
|  |  |  |  |  | Mロケット機能総合試験装置 (66) | 259,000 | ( 0) |
|  |  | 計 | ● 4,501,560<br>6,656,483 | ● 4,096,305<br>8,081,750 |  |  |  |

[Key on following page]

Key:

44. Preliminary design of first material proving test, research and development of on-board test equipment, etc.
45. Rocket launching expenses
46. Tanegashima Space Center Construction expenses
47. Design of H-1 launch site system, only
48. Satellite tracking and control expenses
49. Tsukuba Space Center facility construction expenses
50. H-1 related expenses, only
51. Earth observation data processing expenses
52. Operational expenses
53. General management operational expenses
54. Space Science Research Institute (tentative designation)
55. Expenses needed for special projects
56. Science satellite research expenses
57. Development of No 10 Science Satellite, only
58. Development of No 11 Science Satellite, only
59. M-rocket development expenses
60. Development of M-3S Revised I rocket only
61. Basic research expenses for development of liquid hydrogen engine
62. Participation expenses in space-shuttle project (SEPAC)
63. Ministry of Education
64. Expenses for large and special equipment
65. Equipment expenses for launch pads for science satellites
66. Comprehensive testing system for M rocket combustion
67. Total

（単位：千円）

| 省/庁 | 担当機関 | 事項 | 昭和55年度予算額 | 昭和56年度経費 | 要旨 | 昭和56年度経費 | 昭和55年度予算額 |
|---|---|---|---|---|---|---|---|
| 通商産業省 (68) | 機械情報産業局 (69) | 地球資源衛星の研究開発に必要な経費 (70) | 0 | 2,120,526 | 地球資源衛星1号搭載用合成開口レーダの研究開発、資源探査の観点からの地上[illegible]のための予備設計等 (71) | 2,120,526( | 0) |
| | 工業技術院 (72) | 試験研究所の特別研究等に必要な経費 (73) | 87,252 | 86,808 | 宇宙開発関連機械技術に関する研究（機械技術研究所） (74) | 13,306( | 13,875) |
| | | | | | 宇宙電子技術に関する研究（電子技術総合研究所） (75) | 52,372( | 52,328) |
| | | | | | リモートセンシング技術に関する研究（電子技術総合研究所） (76) | 21,130( | 21,049) |
| | | 一般行政に必要な経費 (77) | 55,809 | 0 | 前年度限り (78) | 0( | 55,809) |
| | 計 | | 143,061 | 2,207,334 | | | |
| 運輸省 (79) | 航空局 (80) | 航空・海上技術衛星の開発研究に必要な経費 (81) | 0 | 35,785 | 航空・海上技術衛星システムに関する調査 (82) | 35,785( | 0) |
| | 電子航法研究所 (83) | 電子航法研究所に必要な経費 (84) | 6,952 | ● 191,400<br>39,294 | 衛星航法に関する実験的研究 (85) | ● 191,400<br>39,294( | 6,952) |
| | 計 | | 6,952 | ● 191,400<br>75,079 | | | |
| 郵政省 (86) | 電波監理局 (87) | 通信衛星及び放送衛星の開発に伴う監督費 (88) | 9,646 | 6,554 | 通信衛星及び放送衛星の開発に伴う監督費 (89) | 6,554( | 9,646) |
| | | 第二世代の実用衛星の利用と開発 (90) | 0 | 25,505 | 第二世代の実用衛星の利用と開発 (91) | 25,505( | 0) |
| | . | 小計 | 9,646 | 32,059 | | | |
| | 電波研究所 (92.) | 電波研究所の運営に必要な経費 (93) | 303,659 | ● 1,035,300<br>431,934 | レーダを用いた衛星アンテナの高精度方向制御システムの研究開発 (94) | 40,410( | 43,774) |
| | | | | (95) | 航空・海上技術衛星（AMES）の研究開発 | ● 1,035,300<br>124,547( | 57,365) |
| | | | | (96) | 衛星搭載用能動型電波リモートセンサーの研究開発 | 50,000( | 100,241) |
| | | | | (97) | 電離層観測衛星搭載用ミッション機器の研究開発 | 21,000( | 87,279) |

[Key on following page]

Key:

68. Ministry of International Trade and Industry
69. Machinery and Information Industries Bureau
70. Expenses needed for research and development of earth resources satellites
71. Research and development of synthetic open-moutn radar on earth resources satellite No 1; preliminary design of earth resources satellite No 1 for resources probing.
72. Agency of Industrial Science and Technology
73. Expenses needed for special research at testing and research institutions
74. Research in space development related machinery technology (Machinery Technology Research Institute)
75. Research in space electronic engineering (Electronics Engineering Research Institute)
76. Research in remote sensing technology (Electronics Engineering Research Institute)
77. General Administrative Expenses
78. Limited to previous year
79. Ministry of Transport
80. Civil Aviation Bureau
81. Expenses needed for development and research of aviation-marine engineering satellites
82. Survey on aviation-marine engineering satellite systems
83. Electronics Navigation Research Institute
84. Expenses needed for Electronics Navigation Research Institute
85. Experimental research in satellite navigation
86. Ministry of Posts and Telecommunications
87. Radio Regulatory Bureau
88. Operating expenses accompanying development of communication and broadcasting satellites
89. Operating expenses accompanying development of communication and broadcasting satellites
90. Utilization and development of practical satellites of the second generation
91. Utilization and development of practical satellites of the second generation
92. Radio Research Laboratory
93. Expenses needed for operation of Radio Research Laboratory
94. Research and development of high precision direction control system of satellite antennae using laser
95. Research and development of aviation-marine engineering satellites (AMES)
96. Research and development of active radio remote sensors on board satellite
97. Research and development of mission equipment on board electromagnetic environmental observation satellite

（単位：千円）

| 省庁 | 担当機関 | 事項 | 昭和55年度<br>予算額 | 昭和56年度<br>概算 | 要旨 | 昭和56年度<br>概算 | 昭和55年度<br>予算額 |
|---|---|---|---|---|---|---|---|
| 郵政省 | 電波研究所 |  |  | (98) | 衛星用マルチビームアンテナの研究開発 | 20,000( | 15,000) |
|  |  |  |  | (99) | ミリ波帯衛星通信技術の実験研究 | 140,977( | 0) |
|  |  |  |  | (100) | 衛星を用いた捜索救難通信システムの研究開発 | 35,000( | 0) |
|  | 計 |  | 313,305 | ● 1,035,300<br>463,993 |  |  |  |
| 合(101)計 |  |  | ●55,774,160<br>92,217,083 | ●73,349,005<br>99,081,507 |  |  |  |

Key:

98. Research and development of multibeam antenna for satellites
99. Experiment and research in milliwave band satellite communications engineering
100. Research and development of search and rescue communications system using satellites
101. Grand Total

9710
CSO: 4105

## SCIENCE AND TECHNOLOGY

### BRIEFS

HEATING, COOLING EXPERIMENTS--Yamagata Feb 4 KYODO--Researchers at Yamagata University are investigating ways of using underground water and solar energy for heating and cooling homes and other buildings, it was revealed Wednesday. The water is seen as ideal for this purpose, because it is cool in summer and warm in winter. The researchers are currently experimenting at a machinery factory attached to the Engineering Department of the university at Yonezawa. They have dug one well for hot water and one for cold, on either side of the building. In winter hot water is piped into the building to provide heating, then it is released on the roof where it melts any snow which has accumulated there. In summer the process is reversed, and cold water is piped through the building to provide cooling. Then it is pumped onto the roof, where solar energy heats it. The winter experiments have revealed that this method is capable of melting any amount of snow piled up on a roof. [Text] [OW041045 Tokyo KYODO in English 0817 GMT 4 Feb 81]

CSO: 4120

END

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